

**ABSTRACT OF THE INVENTION**

Dissolved inorganic contaminants are removed from a dilute aqueous stream by adding a hydrolysable metal compound to the aqueous stream, co-precipitating a hydrolyzed metal compound with the inorganic contaminants, and, concurrently with the co-precipitation step, filtering the co-precipitate from the dilute aqueous stream using a packed bed filter. The process may be carried out so that the metal oxide co-precipitate forms within the packed bed. Dissolved contaminants, particularly arsenic compounds, are removed more efficiently than by conventional co-precipitation/filtration processes. An apparatus for carrying out the process provides for injection of the hydrolysable metal compound into the dilute aqueous stream immediately upstream of the packed bed filter, without an intervening flocculation or sedimentation vessel, thereby providing an effective contaminant removal system that requires a smaller footprint and lower capital cost than conventional water treatment systems.